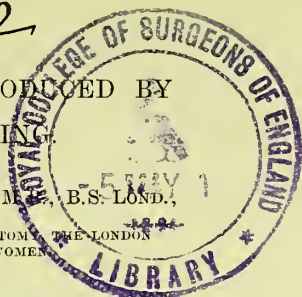


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## THE IDEAL LESION PRODUCED BY JUDICIAL HANGING.

BY FREDERIC WOOD-JONES, D.Sc., M.A., B.S. LOND.,

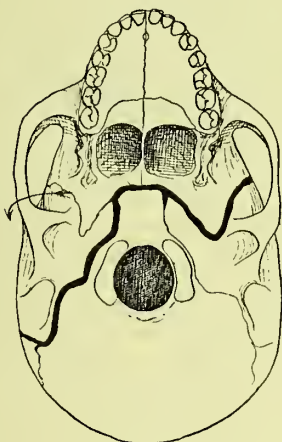
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THERE are at present in the Museum of the Royal College of Surgeons of England two most interesting series of examples of the lesion caused by judicial hanging: the first series is seen among the Roman period skulls of the Nubian Survey collection, and the second is a recent donation from Captain C. F. Fraser, I.M.S., one time superintendent of Rangoon Central Jail.

The first series has already been discussed in various publications, and may be summarised briefly as skulls showing a peculiar fracture of the base (depicted in Fig. 1)

FIG. 1.



The lesion present in the Nubian series of hangings and in the skull of Dr. Pritchard. Fractured base of the skull; effect of a subaural knot.

following upon leverage imparted to one temporal bone by a knot placed beneath the angle of the jaw. The position of the knot was a matter of conjecture in these Nubian skulls, yet the causation of the lesion appeared to be so clear that it seemed possible to say in any given skull upon which side of the head the knot was placed.

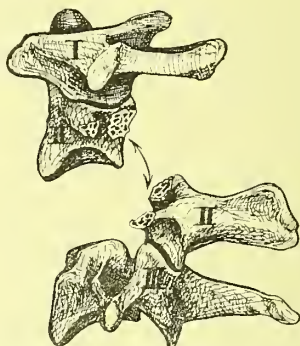
In 1865 Pritchard was executed for his crimes, and in February, 1912, his skull was described by Dr. G. H. Edington. From the lesion shown in this skull (a lesion identical with that in the Nubian series) one felt justified in further discussion in stating as an assumption that the knot had been placed far back upon the jaw, as it clearly seemed to have been in the Nubian series. It also seemed to be a just assumption that the knot in Pritchard's case was placed upon the right side. It has recently come to my knowledge that a medical man who actually witnessed the execution can corroborate this assumption. He noted the position of the knot, and standing to the right of the scaffold he

“distinctly remembers that the criminal’s head lay over towards the left shoulder ” after the drop.

Such a knot is termed subaural, and for some reason—probably because there is little fear of it slipping—it is the favourite with hangmen ; and yet from its very frequent failure to produce any lesion of the neck and to cause instantaneous death it can only be described as a very bad one. Death by fracture of the base of the skull, or, falling short of this, death by strangulation, is not an ideal method of execution ; and from the evidence that has accumulated it seems to me just to say that, short of decapitation, death by subaural knot is uncertain in its rapidity, and in its mode of production.

Turning now to the second series, we have five sets of cervical vertebræ all showing an identical lesion—i.e., the fracture dislocation of the axis vertebra shown in Fig. 2. It

FIG. 2.



The lesion present in Captain C. F. Fraser’s series of judicial hangings. Separation of the arch of the axis from the body ; effect of a submental knot.

is to be noted that the odontoid process plays no part in producing death, but that the posterior arch of the axis is snapped clean off and remains fixed to the third vertebra, while the atlas, the odontoid process, and the anterior arch of the axis remain fixed to the skull. This lesion is produced by the violent jerk which throws the man’s head suddenly backwards and snaps his axis vertebra. Death in this series of cases was uniformly instantaneous, for the spinal cord was cleanly severed by the fracture of the neck. In every instance the knot was placed “a little to the left of the chin”—i.e., was a submental knot, or as near submental as the circumstances allowed. No more instructive illustration of the action of the submental knot could be furnished than that given in this series of Captain Fraser.

For a long while the facts here mentioned have been known in an indefinite way. The submental knot was strongly advocated to, and apparently approved by, the Committee on Capital Sentences in 1886, but it was not made a recommendation in its resolutions. It is used by medical officers upon whom the duty devolves in outlying stations, but it is not the English official judicial method. The reason for this, I think, is clear. Men were at one time hanged by the neck until they were dead—i.e., strangled ; and at that time, as many old prints depict, the knot was suboccipital. With the introduction of the “drop” in 1818 this knot was found unsuitable, and a subaural knot was used. I imagine that these series of lesions will show clearly what many have advocated for years, that the submental knot should now supersede the subaural knot in our English judicial hangings.

## JUDICIAL HANGING.

To the Editor of THE LANCET.

SIR,—I was much interested in Dr. F. Wood-Jones's paper on the above subject in THE LANCET of Jan. 4th, as he had kindly shown me the specimens in the College of Surgeons Museum not long ago. In 1886 I attended several judicial executions by Home Office authority, on the recommendation of Lord Aberdare's Capital Sentences Committee, appointed by the then Home Secretary, Sir Richard Assheton (now Lord) Cross, before which I gave evidence and explained a chin-trough I had invented, with the object of keeping the knot or "eye" of the rope under the point of the chin, which several experienced medical witnesses considered to be the most deadly position, dislocation or fracture having been found by them whenever the knot chanced to be under the chin.

I was under the impression that this submental knot had been adopted, and the subaural long discarded; so was much surprised on finding the latter still "in full swing." I had felt instinctively that by delivering (by means of my trough) the upward and backward blow caused by the sudden check to the fall of the body on the point of the chin, the hinged head would be so rapidly and violently thrown back, at the exact second that the posterior segment of the noose struck forward the top of the neck, that the hinge must give way and dislocation take place, probably between the atlas and axis with (as I thought) fracture of the odontoid process of the latter, rupture of the cord, and instantaneous death. I also thought that this action would place the joint in one of those abnormal positions considered necessary for almost any dislocation in the body. I trusted to leverage on the chin to jerk the head back, but it was advanced against me that a man can voluntarily put his head back to within  $10^{\circ}$  of the angle the trough could force it, utterly ignoring the difference between a sudden terrific blow and a cautious movement of our own sweet will. I also coupled with my *arte non vi* treatment the certain possibility of reducing all drops to three or four feet.

The opposition to my chin leverage was most pronounced on the part of Dr. James Barr, medical officer to the county prison of Lancashire at Kirkdale, now Sir James Barr, the distinguished President of the British Medical Association. His belief was in the "energy of the fall as the chief factor" in successful executions, and he looked upon the position of the knot as "of secondary importance," but then he did not think it "a very material point whether the scaffold should be level with the ground or should have steps"—for the wretched culprit to climb.

Of my own humble effort the chairman, Lord Aberdare, was good enough to say: "As far as your object goes it quite falls in with what we wished—namely, to keep the knot under the chin"; and, later on, dealing with the risk of decapitation, "that arises from the fact that the rope is not properly adjusted under the chin; but if you could be sure of the knot remaining here and so jerking the head back you would then be sure of producing fracture," to which Dr. Samuel Haughton added, "we can produce fractures now by moderate drops, by securing the head being thrown back; this [my trough] is a step in the right direction." However, the committee recommended a scale of drops according to weight, chiefly, I believe, on Dr. Barr's suggestions, calculated to deliver a blow on the neck in all cases

of about 1260 foot pounds. This means, for a culprit weighing 10 stone, or 140 pounds, a drop of 9 feet

( $140 \times 9 = 1260$ , or  $\frac{1260}{140} = 9$ ), but I believe, from figures

given in newspaper accounts of executions for some time after, that not more than about three-fourths of these lengths were actually given.

I was recommended by Dr. Haughton to experimentalise on the cadaver, but found it impossible to get one until recently, when I obtained the most satisfactory results—viz., a definite fracture of the neck in a human body weighing 73 pounds with a drop of 4 feet, producing a blow of 292 foot pounds, the drop for which by the committee's scale would be over 12 feet.

May I here appeal to the authorities of the London medical schools to place at my disposal some of their subjects so that I may thoroughly test my system, which I can do without in any way interfering with the usefulness of the bodies for future dissection by their students? Such experiments must soon prove the correctness of Dr. Wood-Jones's concluding sentence "that these series of lesions" (doubtless repeated by the chin-trough) "will show clearly what many have advocated for years, that the submental knot should now supersede the subaural knot in our English hangings."

I am, Sir, yours faithfully,

JOHN J. DE ZOUCHE MARSHALL, L.R.C.S.I., &c.,  
Lieutenant-Colonel, R.A.M.C. (T.), retired.

Thames Ditton, S.W., Jan. 13th, 1913.